

CLAIMS

I claim:

- 5           1       A cartridge adapted for coupling to a fluid pump comprising:
- a body having a bore;
- a fluid inlet at a proximal end of the bore;
- a fluid outlet at a distal end of the bore;
- a feed screw for delivering fluid from the fluid inlet to the fluid outlet, the feed
- 10       screw having a longitudinal axis, the fluid inlet being elongated in a direction along the longitudinal axis of the feed screw; and
- a dispense tip at the fluid outlet having a longitudinal fluid path, the dispense tip having outlet vents at an output end, the outlet vents extending radially from the fluid path.
- 15           2       The cartridge of claim 1 wherein the outlet vents each comprise a V-groove having first and second inner surfaces.
- 3       The cartridge of claim 2 wherein the first and second inner surfaces of the V-groove intersect at an angle ranging between 45 degrees and 135 degrees.
- 20           4       The cartridge of claim 1 wherein the outlet vents are treated by a finishing process that reduces surface tension.
- 5       The cartridge of claim 1 wherein the output end of the dispense tip includes a relieved outer surface.
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6 The cartridge of claim 1 wherein the output end of the dispense tip includes a beveled  
outer surface.

5 7 The cartridge of Claim 1 wherein the fluid inlet includes an elongated slot formed in  
the liner for receiving material provided at the fluid inlet, and for providing a pooling  
region for material to be distributed to the feed screw.

8 The cartridge of Claim 1 further comprising a closed-loop servo-motor coupled to the  
feed screw for positioning the feed screw.

10 9 A fluid dispensing pump comprising:

a feed screw having a helical cavity defined between a major diameter and a  
minor diameter of a thread of the feed screw;

15 a cartridge body having a cavity in communication with the feed screw for  
introduction of dispensing fluids into the helical cavity;

a motor having indexed rotational positions for controlling rotational position  
of the feed screw during a dispensing operation; and

20 a dispense tip at a fluid outlet of the helical cavity having a longitudinal fluid  
path, the dispense tip having outlet vents at an output end, the outlet vents extending  
radially from the fluid path.

10 The fluid dispensing pump of claim 9 wherein the outlet vents each comprise a V-  
groove having first and second inner surfaces.

25 11 The fluid dispensing pump of claim 10 wherein the first and second inner surfaces of  
the V-groove intersect at an angle ranging between 45 degrees and 135 degrees.

- 12 The fluid dispensing pump of claim 9 wherein the outlet vents are treated by a finishing process that reduces surface tension.
- 13 The fluid dispensing pump of claim 9 wherein the output end of the dispense tip includes a relieved outer surface.
- 14 The fluid dispensing pump of claim 9 wherein the output end of the dispense tip includes a beveled outer surface.
- 15 The fluid dispensing pump of claim 9 wherein the cavity is positioned along a side portion of the feed screw.
- 16 The fluid dispensing pump of Claim 15 wherein the cavity is elongated in a direction substantially along a longitudinal axis of the feed screw.
- 17 The fluid dispensing pump of Claim 9 wherein the motor comprises a closed-loop servo-motor having a positional encoder.

- 18 A fluid dispensing tip comprising
  - an elongated cylindrical neck;
  - a cylindrical bore machined in the neck centered at the longitudinal axis, the cylindrical bore having a cylindrical input end at an input end of the neck and a cylindrical output end at an output end of the neck;
  - said cylindrical input end of said bore having a first inner diameter and said cylindrical output end of said bore having a second inner diameter, the first inner diameter being greater than the second inner diameter;
  - an inner taper machined in the bore between the cylindrical input end and the cylindrical output end for transitioning the inner surface of the bore from the first inner diameter to the second inner diameter, the inner taper being proximal to the output end of the neck; and
  - outlet vents at the output end of the neck, the outlet vents extending radially from the fluid path.
- 19 The fluid dispensing tip of claim 18 wherein the outlet vents each comprise a V-groove having first and second inner surfaces.
- 20 The fluid dispensing tip of claim 19 wherein the first and second inner surfaces of the V-groove intersect at an angle ranging between 45 degrees and 135 degrees.
- 21 The fluid dispensing tip of claim 18 wherein the outlet vents are treated by a finishing process that reduces surface tension.
- 22 The fluid dispensing tip of claim 18 wherein the output end of the dispense tip includes a relieved outer surface.

- 23 The fluid dispensing tip of claim 18 wherein the output end of the dispense tip includes a beveled outer surface.
- 24 The fluid dispensing tip of claim 18 wherein the bevel is ground substantially along the longitudinal axis of the neck such that any tooling marks resulting therefrom are substantially aligned with the longitudinal axis.
- 25 The fluid dispensing tip of claim 18 wherein the vents are ground substantially along their longitudinal axes such that any tooling marks resulting therefrom are substantially aligned with the longitudinal axes of the vents.